

# MI956

Intel® Sandy Bridge / PCH  
Mini-ITX Motherboard

## USER'S MANUAL

Version 1.0

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# Introduction

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## Product Description

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The MI956F Mini ITX motherboard is based on the latest Intel® QM67 chipset. The platform supports 2<sup>nd</sup> generation Intel® Core processor family with rPGA988B packing and features an integrated dual-channel DDR3 memory controller as well as a graphics core.

The latest Intel® processors provide advanced performance in both computing and graphics quality. This meets the requirement of customers in the gaming, POS, digital signage and server market segment.

The Intel® QM67 is made with 32 nanometer technology that supports Intel's first processor architecture to unite the CPU and the graphics core on the transistor level. The MI956F Mini ITX board utilizes the dramatic increase in performance provided by this Intel's latest cutting-edge technology. Measuring 170mm x 170mm, MI956F offers fast 6Gbps SATA support (2 ports), USB3.0 (2 ports) and interfaces for DVI-D, DVI-I, LVDS and HDMI displays. MI956AF features Intel Active Management Technology 7.0.

### MI956F FEATURES:

- Supports Intel® 2nd Generation Core i7/i5/i3 QC/DC mobile processors
- Two DDR3 SoDIMM, 1066/1333MHz, Max. 16GB memory
- Dual Intel® PCI-Express Gigabit LAN
- Integrated Graphics for DVI-I, DVI-D/HDMI/LVDS displays
- 4x SATA 2.0, 2x SATA 3.0, 8x USB 2.0, USB 3.0 (2 ports), 4x COM, Watchdog timer
- 1x PCI-E (x16), 1x Mini PCI-E
- Optional AMT (MI956AF only)

## Checklist

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Your MI956 package should include the items listed below.

- The MI956 Mini-ITX motherboard
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Serial ATA cable

## MI956 Specifications

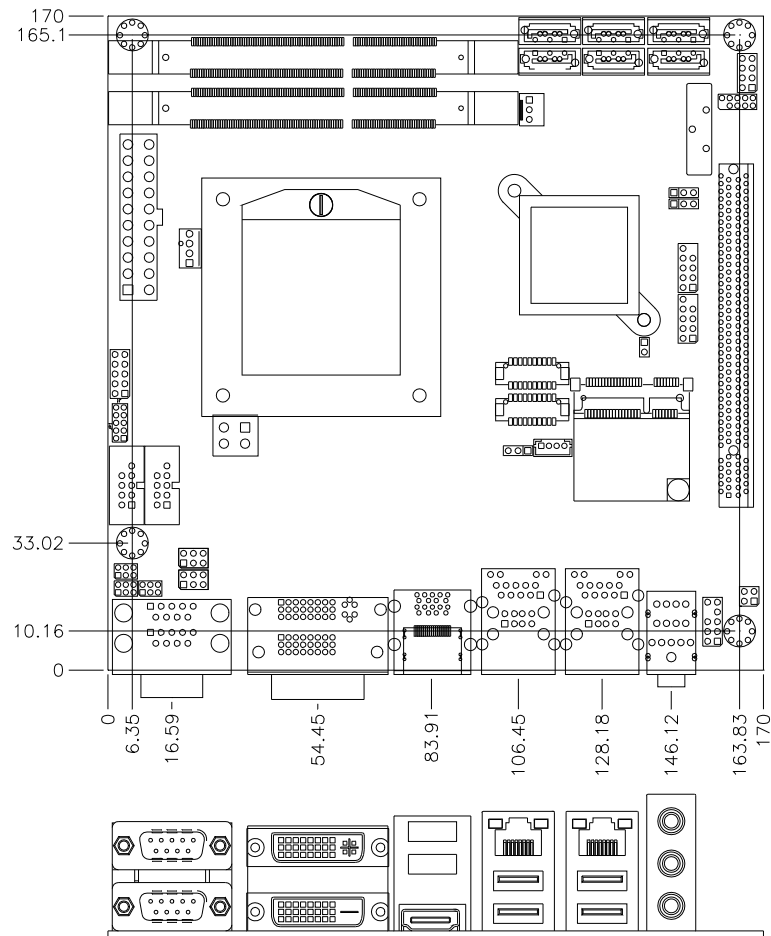
<b>Product Name</b>	<b>MI956AF/MI956F</b>
<b>Form Factor</b>	Mini-ITX
<b>CPU Type</b>	<ul style="list-style-type: none"> <li>- Intel® 2<sup>nd</sup> generation Core™ i7/i5/i3 QC/DC mobile processor</li> <li>- rPGA package, 37.5 x 37.5 mm</li> <li>- TDP: QC = 45W~ 55W/ DC = 35W</li> <li>**Sandy Bridge CPU is <u>NOT</u> socket compatible with Arrandale</li> </ul>
<b>CPU Speed</b>	Up to 2.7GHz
<b>Cache</b>	Up to 8MB
<b>CPU Socket</b>	rPGA 988B
<b>Chipset</b>	Intel® QM67 PCH; 25 x 27 mm package size
<b>BIOS</b>	AMI BIOS, support ACPI Function
<b>Memory</b>	Intel® 2 <sup>nd</sup> generation Core™ i7/i5/i3 QC/DC mobile processor integrated memory controller DDRIII 1067/1333 MHz - SO-DIMM x 2 (w/o ECC), Max. 16GB
<b>VGA</b>	- Intel® 2 <sup>nd</sup> generation Core™ i7/i5/i3 mobile processor integrated Gfx <ul style="list-style-type: none"> <li>• DVI-I X 1 (thru Level shifter ASM1442)</li> <li>• DVI-D X 1 (thru Level shifter ASM1442)</li> <li>• HDMI X 1 (thru Level shifter ASM1442)</li> <li>• LVDS : DF13 x 2 for supporting dual channel 24-bit</li> </ul>
<b>LAN</b>	1. Intel® Lewisville 82579LM GbE PHY [MI956AF only] or 82579V GbE PHY [MI956F only] 2. Intel® 82583V as 2 <sup>nd</sup> GbE
<b>USB</b>	USB 2.0 host controller, supports 8 ports w/ two EHCI, 7 UHCI controllers Integrated USB 2.0 Rate Matching Hub. <ul style="list-style-type: none"> <li>- 4 ports in the rear panel</li> <li>- Others reserved for onboard pin header ( 4 ports, 2.54mm pitch)</li> </ul> USB 3.0 host controller [ASMedia # ASM1042], support 2 ports <ul style="list-style-type: none"> <li>- 2 ports in the rear panel</li> </ul>
<b>Serial ATA</b>	Intel® QM67 PCH built-in SATA controller, supports total 6 ports 2 x SATA (3.0) 6Gbps+ 4 x SATA (2.0) 3Gbps ports (2 FIS based Port Multiplier)
<b>Audio</b>	Intel® QM67 PCH built-in High Definition Audio controller+ ALC892 w/ 7.1 CH
<b>LPC I/O</b>	Fintek F81865-I ( <b>Ver. C</b> ) COM1 (RS232/422/485), COM2/COM3/COM4 (RS232), Hardware Monitor (2 thermal inputs, 4 voltage monitor inputs & 2 fan headers) [CPU FAN controllabl, but not the system fan] COM1/2 with pin-9 with power for 2 ports (500 mA for each port)
<b>Digital IO</b>	4 in & 4 out
<b>IAMT(7.0)</b>	Intel® QM67 PCH built-in (MI956AF only) - Intel® Active Management Technology ver. 7.0
<b>Expansion Slots</b>	- PCI-Express (16x) *1 [PEG] - Mini PCI-Express (1x) *1 @ Solder side [Reserved mounting holes for Half-sized also]
<b>Edge Connector:</b>	DVI-D + DVI-I stack connector; Dual DB9 stack connector for COM #1, #2 Dual USB(3.0) dual stack connector; HDMI stack connector Gbit LAN RJ-45 + dual USB(2.0) stack connector x2 RCA Jack 3x1 for HD Audio
<b>Onboard Header/Connector</b>	2 ports x SATA III [Blue color]; 4 ports x SATA II 2x5 pin-header x2 for 4 ports USB; 2x5 pin-header for front panel audio 2x10 pin-header for COM3 (RS232) & COM4 (RS232) 2x5 pin-header for Digital IO; 4-pin box header for LCD backlight control
<b>Watchdog Timer</b>	Yes (256 segments, 0, 1, 2...255 sec/min)
<b>System Voltage</b>	<b>ATX</b>
<b>Others</b>	LAN Wakeup, EuP/ErP feature (Fintek F75160), UL 60950-1 2 <sup>nd</sup> Edition compatible

## INTRODUCTION

Board Size	170mm x 170mm
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## Board Dimensions



## Installations

This section provides information on how to use the jumpers and connectors on the MI956 in order to set up a workable system. The topics covered are:

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Installing the Memory.....	8
Setting the Jumpers.....	9
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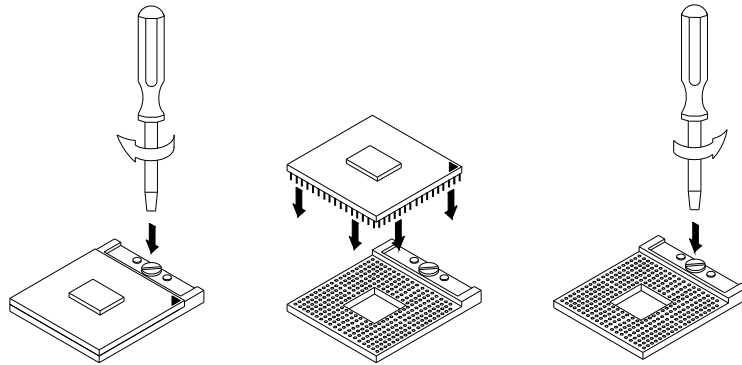
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## Installing the CPU

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The MI956 board supports rPGA988B socket for Intel® Sandy Bridge Dual Core mobile processors.

The processor socket comes with a screw to secure the processor. As shown in the left picture below, loosen the screw first before inserting the processor. Place the processor in to the socket by making sure the notch on the corner of the CPU corresponds with the notch on the inside of the socket. Once the processor has slide into the socket, fasten the screw. Refer to the figures below.



**NOTE:** Ensure that the CPU heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause your system to hang or be unstable.

## Installing the Memory

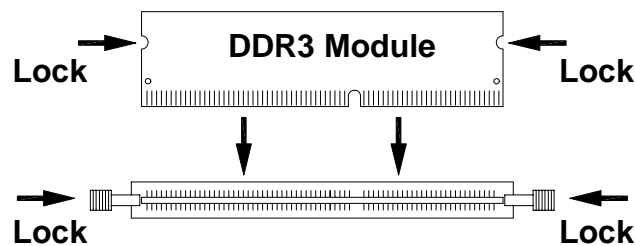
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The MI956 board supports two DDR3 memory socket for a maximum total memory of 16GB in DDR3 SO-DIMM memory type.

### Installing and Removing Memory Modules

To install the DDR3 modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR3 module so that the key of the DDR3 module aligned with that on the memory slot.
2. Gently push the DDR3 module in an upright position until the clips of the slot close to hold the DDR3 module in place when the DDR3 module touches the bottom of the slot.
3. To remove the DDR3 module, press the clips with both hands.



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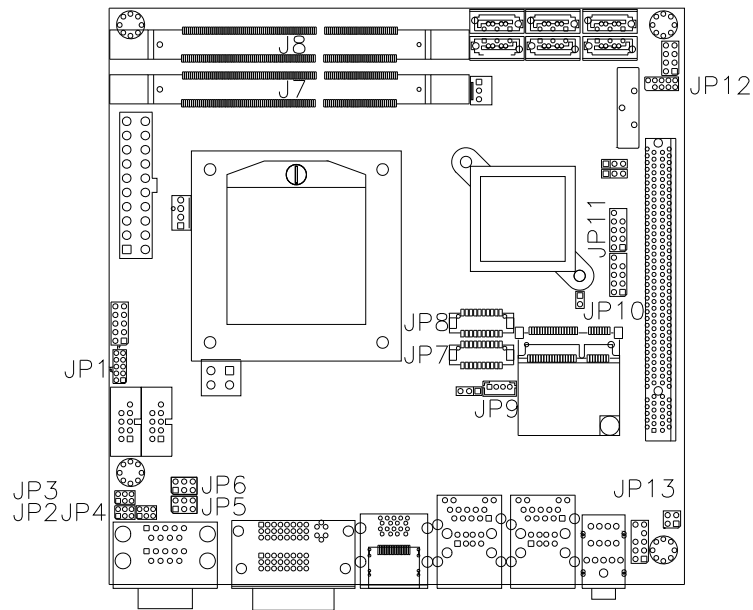
## Setting the Jumpers

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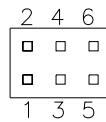
Jumpers are used on MI956 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MI956 and their respective functions.

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J14: Flash Descriptor Security Override (Factory use only).....	12
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## Jumper Locations on MI956



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J22: Clear ME Contents .....	12
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**JP2, JP3, JP4: RS232/RS422/RS485 (COM1) Selection**

COM1 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP2: 3-5&4-6	JP2: 1-3&2-4	JP2: 1-3&2-4
	JP3: 1-2	JP3: 3-4	JP3: 5-6
	JP4: 3-5 & 4-6	JP4: 1-3 & 2-4	JP4: 1-3 & 2-4



**JP5: COM1 RS232 RI/+5V/+12V Power Setting**

JP5	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V

**JP6: COM2 RS232 RI/+5V/+12V Power Setting**

JP6	Setting	Function
	Pin 1-2 Short/Closed	+12V
	Pin 3-4 Short/Closed	RI
	Pin 5-6 Short/Closed	+5V



**J10: LCD Panel Power Selection**

J10	LCD Panel Power
 1 2 3	3.3V
 1 2 3	5V



**J14: Flash Descriptor Security Override (Factory use only)**

J14	Flash Descriptor Security Override
Open	Disabled (Default)
Close	Enabled

**J22: Clear ME Contents**

J22	Setting	Function
 1 2 3	Pin 1-2 Short/Closed	Normal
 1 2 3	Pin 2-3 Short/Closed	Clear ME

**J23: Clear CMOS Contents**

J23	Setting	Function
 1 2 3	Pin 1-2 Short/Closed	Normal
 1 2 3	Pin 2-3 Short/Closed	Clear CMOS

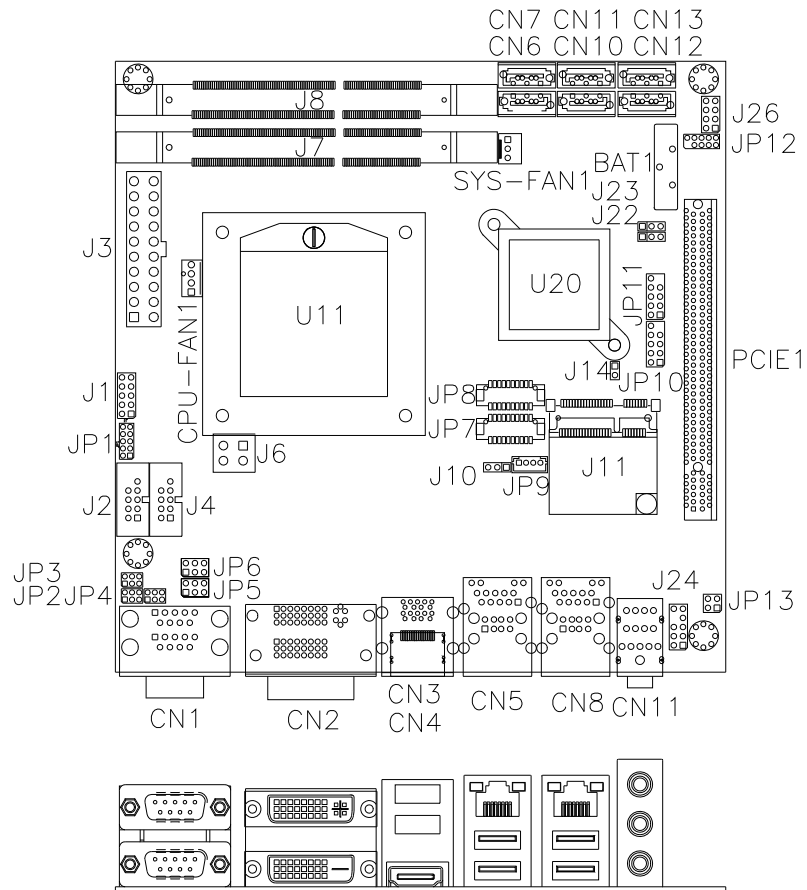


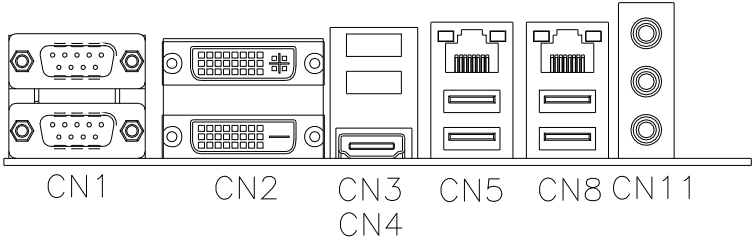
## Connectors on MI956

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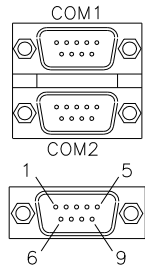
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## Connector Locations on MI956



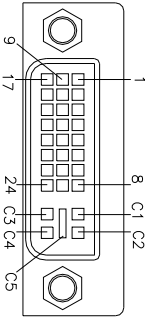


CN1: COM1 and COM2 Serial Ports

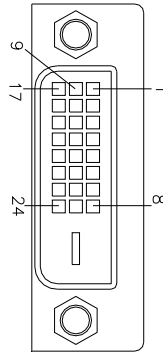
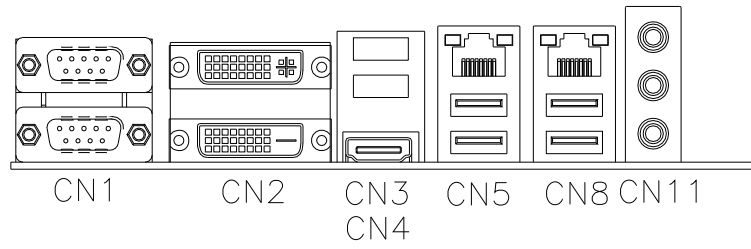


Pin #	Signal Name		
	RS-232	R2-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

CN2: DVI-D and DVI-I Connector



Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
N.C	8	23	CLOCK -
DATA 1-	9	24	CLOCK +
DATA 1+	10	C1	N.C
SHIELD 1/3	11	C2	N.C
DATA 3-	12	C3	N.C
DATA 3+	13	C4	N.C
DDC POWER	14	C5	A GROUND2
A GROUND 1	15	C6	A GROUND3



Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
N.C	8	23	CLOCK -
DATA 1-	9	24	CLOCK +
DATA 1+	10	C1	N.C.
SHIELD 1/3	11	C2	N.C.
DATA 3-	12	C3	N.C.
DATA 3+	13	C4	N.C.
DDC POWER	14	C5	N.C.
A GROUND 1	15	C6	N.C.

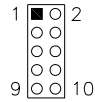
**CN3: USB3.0 Connector**

**CN4: HDMI Connector**

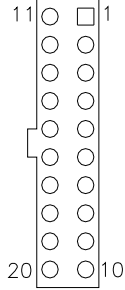
**CN5: Gigabit LAN (Intel 82579LM) + USB 2/3**

**CN8: Gigabit LAN (Intel 82583V) + USB 0/1**

**CN11: HD Audio Connector**

**J1: Digital I/O**

Signal Name	Pin	Pin	Signal Name
GND	1	2	VCC
OUT3	3	4	OUT1
OUT2	5	6	OUT0
IN3	7	8	IN1
IN2	9	10	IN0

**J3: ATX Power Supply Connector**

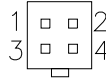
Signal Name	Pin #	Pin #	Signal Name
3.3V	11	1	3.3V
-12V	12	2	3.3V
Ground	13	3	Ground
PS-ON	14	4	+5V
Ground	15	5	Ground
Ground	16	6	+5V
Ground	17	7	Ground
-5V	18	8	Power good
+5V	19	9	5VSB
+5V	20	10	+12V

**J2, J4: COM3, COM4 RS232 Serial Ports**

Signal Name	Pin #	Pin #	Signal Name
DCD#	1	6	DSR#
SIN#	2	7	RTS#
SOUT	3	8	CTS#
DTR#	4	9	RI#
GND	5	X	KEY

**J6: ATX 12V Power Connector**

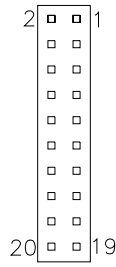
This connector supplies the CPU operating voltage.



Pin #	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

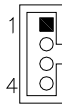
### JP8, JP7: LVDS Connectors (1st channel, 2nd channel)

The LVDS connectors on board consist of the first channel (LVDS1) and second channel (LVDS2).



Signal Name	Pin #	Pin #	Signal Name
TX0-	2	1	TX0+
Ground	4	3	Ground
TX1-	6	5	TX1+
5V/3.3V	8	7	Ground
TX3-	10	9	TX3+
TX2-	12	11	TX2+
Ground	14	13	Ground
TXC-	16	15	TXC+
5V/3.3V	18	17	ENABKL
+12V	20	19	+12V

### JP9: LCD Backlight Connector

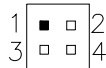


Pin #	Signal Name
1	+12V
2	Backlight Enable
3	Brightness Control
4	Ground

### JP10, JP11: USB Connectors

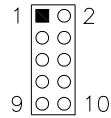
Signal Name	Pin	Pin	Signal Name
VCC	1	2	Vcc
D0-	3	4	D1-
D0+	5	6	D1+
GND	7	8	GND
KEY	9	10	NC

### JP13: SPDIF I/O



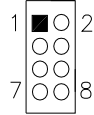
Pin #	Signal Name
1	SPDIF IN
2	Ground
3	SPDIF OUT
4	Ground

#### J24: Audio Pin Header for Chassis Front Panel



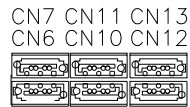
Signal Name	Pin	Pin	Signal Name
MIC IN_L	1	2	Ground
MIC IN_R	3	4	DET
LINE_R	5	6	Ground
Sense	7	8	KEY
LINE_L	9	10	Ground

#### J26: Front Panel Connector



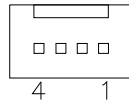
Signal Name	Pin #	Pin #	Signal Name
Power BTN	1	2	Power BTN
HDD LED+	3	4	HDD LED-
Reset BTN	5	6	Reset BTN
Power LED+	7	8	Power LED-

#### CN6, CN7, CN9, CN10, CN12, CN13: SATA Connectors



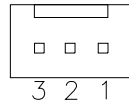
Pin #	Signal Name
1	Ground
2	TX+
3	TX-
4	Ground
5	RX-
6	RX+
7	Ground

#### CPU\_FAN1: CPU Fan Power Connector



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

#### SYS\_FAN1: System Fan1 Power Connector



Pin #	Signal Name
1	Ground
2	+12V
3	NC

**JP1: LPC Debug Connector (Factory use only)**

**J11: Mini-PCIE Connector**

**JP12: SPI Flash Connector (Factory use only)**



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## **BIOS Setup**

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

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## BIOS Introduction

The BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

## BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

```
Press <DEL> or <F2> to Enter Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

## Main BIOS Setup

This setup allows you to record some basic hardware configurations in your computer system and set the system clock.

Aptio Setup Utility – Copyright © 2010 American Megatrends, Inc.

Main	Advanced	Chipset	Boot	Security	Save & Exit
<b>BIOS INFORMATION</b>					
System Language		[English]		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit	
System Date		[Tue 01/06/2009]			
System Time		[00:08:21]			
Access Level		Administrator			

**Note:** *If the system cannot boot after making and saving system changes with Setup, the AMI BIOS supports an override to the CMOS settings that resets your system to its default.*

**Warning:** *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

### System Language

Choose the system default language.

### System Date

Set the Date. Use Tab to switch between Data elements.

### System Time

Set the Time. Use Tab to switch between Data elements.

## Advanced Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Legacy OpROM Support					
Launch PXE OpROM		[Disabled]			
Launch Storage OpROM		[Enabled]			
<ul style="list-style-type: none"> <li>▶ PCI Subsystem Settings</li> <li>▶ ACPI Settings</li> <li>▶ Wake up event setting</li> <li>▶ CPU Configuration</li> <li>▶ EuP/ErP Power Saving Controller</li> <li>▶ SATA Configuration</li> <li>▶ Intel TXT(LT) Configuration</li> <li>▶ PCH-FW Configuration</li> <li>▶ AMT Configuration</li> <li>▶ USB Configuration</li> <li>▶ Super IO Configuration</li> <li>▶ H/W Monitor</li> <li>▶ Serial Port Console Redirection</li> <li>▶ Sandybridge DTS Configuration</li> <li>▶ Sandybridge PPM Configuration</li> </ul>				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & EXIT ESC: Exit	

**REMARKS: The Intel AMT Configuration is available only on MI956AF, not MI956F.**

### Launch PXE OpROM

Enable or Disable Boot Option for Legacy Network Devices.

### Launch Storage OpROM

Enable or Disable Boot Option for Legacy Mass Storage Devices with Option ROM.

## PCI Subsystem Settings

This section allows you to configure the PCI, PCI-X and PCI Express settings.

Aptio Setup Utility			
Main	Advanced	Chipset	Boot      Security      Save & Exit
<b>PCI Bus Driver Version</b>		<b>V 2.03.00</b>	
PCI ROM Priority		EFI Compatible ROM	
<b>PCI Common Settings</b>			
PCI Latency Timer		32 PCI Bus Cycles	
VGA Palette Snoop		Disabled	
PERR# Generation		Disabled	
SERR# Generation		Disabled	
<b>PCI Express Device Settings</b>			
Relaxed Ordering		Disabled	
Extended Tag		Disabled	
No Snoop		Enabled	
Maximum Payload		Auto	
Maximum Read Request		Auto	
<b>PCI Express Link Settings</b>			
ASPM Support		Disabled	
<b>WARNING: Enabling ASPM may cause some PCI-E devices to fail</b>			
Extended Synch		Disabled	
		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit	

### PCI ROM Priority

In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCI Option ROM to launch.

### PCI Latency Timer

Value to be programmed into PCI Latency Timer Register.

### VGA Palette Snoop

Enables or Disables VGA Palette Registers Snooping.

### PERR# Generation

Enables or Disables PCI Device to Generate PERR#.

### SERR# Generation

Enables or Disables PCI Device to Generate SERR#.

### Relaxed Ordering

Enables or Disables PCI Express Device Relaxed Ordering.

**Extended Tag**

If ENABLED allows Device to use 8-bit Tag field as a requester.

**No Snoop**

Enables or Disables PCI Express Device No Snoop option.

**Maximum Payload**

Set Maximum Payload of PCI Express Device or allow System BIOS to select the value.

**Maximum Read Request**

Set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value.

**ASPM Support**

Set the ASPM Level: Force L0- Force all links to L0 Stage:

AUTO – BIOS auto configure:

DISABLE- Disables ASPM.

**Extended Synch**

If ENABLED allows generation of Extended Synchronization patterns.

**ACPI Settings**

System ACPI Parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
	Enable ACPI Auto Configuration		Disabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
	Enable Hibernation		Enabled		
	ACPI Sleep State		S3 (Suspend to R...)		
	Lock Legacy Resources		Disabled		

**Enable ACPI Auto Configuration**

Enables or Disables BIOS ACPI Auto Configuration.

**Enable Hibernation**

Enables or Disables System ability to Hibernate (OS/S4 Sleep State).  
This option may be not effective with some OS.

**ACPI Sleep State**

Select the highest ACPI sleep state the system will enter, when the SUSPEND button is pressed.

**Lock Legacy Resources**

Enables or Disables System Lock of Legacy Resources.



**Wake up event settings**

Enable/Disable Wake up event.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
	Wake system with Fixed Time		Disabled		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
	Wake on Ring		Disabled		
	Wake on PCIE Wake Event		Disabled		

**Wake system with Fixed Time**

Enables or Disables System wake on alarm event. When enabled, System will wake on the hr::min:: sec specified.

**Wake on Ring**

The options are Disabled and Enabled.

**Wake on PCIE Wake Event**

The options are Disabled and Enabled.

## CPU Configuration

This section shows the CPU configuration parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
CPU Configuration					
Intel® Core™ i7-7210QE CPU @ 2.10GHz					
EMT64			Supported		
Max Processor Speed			2100 MHz		
Min Processor Speed			800 MHz		
Processor Speed			2100 MHz		
Processor Stepping			206a7		
Microcode Revision			D		
Processor Cores			4		
Intel HT Technology			Supported		
Hyper-threading			Enabled		→ ←Select Screen
Active Processor Cores			All		↑ ↓ Select Item
Limit CPUID Maximum			Disabled		Enter: Select
Execute Disable Bit			Enabled		+ - Change Field
Hardware Prefetcher			Enabled		F1: General Help
Adjacent Cache Line Prefetch			Enabled		F2: Previous Values
Intel Virtualization Technology			Disabled		F3: Optimized Default
Local x2APIC			Disabled		F4: Save & Exit
					ESC: Exit

### Hyper-threading

Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology). When Disabled, only one thread per enabled core is enabled.

### Active Processor Cores

Number of cores to enable in each processor package.

### Limit CPUID Maximum

Disabled for Windows XP.

### Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3.)

### Hardware Prefetcher

To turn on/off the MLC streamer prefetcher.

**Adjacent Cache Line Prefetch**

To turn on/off prefetching of adjacent cache lines.

**Intel Virtualization Technology**

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology

**Local x2APIC**

Enable Local x2APIC. Some OSes do not support this.

**EuP/ErP Power Saving Controller**

Saving the power consumption on power off.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Standby Power on S5		All Enable		[Enable] Provide the Standby Power for devices. [Disable] Shutdown the standby power.	

**SATA Configuration**

SATA Device Options Settings

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
<b>SATA Controllers(s)</b>		<b>Enabled</b>		Enable or disable SATA Device.	
SATA Mode Selection		IDE			
Serial ATA Port 0		Empty			
Software Preserve		Unknown			
Serial ATA Port 1		Empty			
Software Preserve		Unknown			
Serial ATA Port 2		Empty			
Software Preserve		Unknown			
Serial ATA Port 3		Empty			
Software Preserve		Unknown			
Serial ATA Port 4		Empty			
Software Preserve		Unknown			
Serial ATA Port 5		Empty			
Software Preserve		Unknown			

**SATA Mode**

Determines how SATA controllers(s) operate. The options are IDE, AHCI and RAID.

## PCH-FW Configuration

Configure Management Engine Technology Parameters.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
ME FW Version 0.0.0.0 ME Firmware Mode ME Firmware Type Full Sku Firmware ME Firware SKU Unidentified <b>Firmware Update Configuration</b>				Configure Management Engine Technolory Parameters.  → ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit	

## AMT Configuration

Configure Active Management Technology Parameters.

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Intel AMT Enabled Intel AMT Setup Prompt Enabled BIOS Hotkey Pressed Disabled MEBx Selection Screen Disabled Verbose Mebx Output Enabled Hide Un-Configure ME Confirmation Disabled MeBx Debug Message Output Disabled Un-Configure ME Disabled Intel AMT Password Write Enabled Enabled Amt Wait Timer 0 ASF Enabled Activate Remote Assistance Process Disabled USB Configure Enabled PET Progress Enabled Intel AMT SPI Protected Disabled AMT CIRA Timeout 0 Watchdog Disabled OS Timer 0 BIOS Timer 0				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit	

### Intel AMT

Enable/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.

**Intel AMT Setup Prompt**

OEMFLag Bit 0:

Enable/Disable Intel AMT Setup Prompt to wait for hot-key to enter setup.

**BIOS Hotkey Pressed**

OEMFLag Bit 1:

Enable/Disable BIOS hotkey press.

**MeBx Selection Screen**

OEMFLag Bit 2:

Enable/Disable MEBx selection screen.

**Verbose Mebx Output**

OEMFLag Bit 3:

Enable/Disable Verbose Mebx Output.

**Hide Un-Configure ME Confirmation**

OEMFLag Bit 6:

Hide Un-Configure ME without password Confirmation Prompt.

**MeBx Debug Message Output**

OEMFLag Bit 14:

Enable MEBx debug message output.

**Un-Configure ME**

OEMFLag Bit 15:

Un-Configure ME without password.

**Intel AMT Password Write Enabled**

Enable/Disable Intel AMT Password Write. Password is writeable when set Enable.

**Amt Wait Timer**

Set timer to wait before sending ASF\_GET\_BOOT\_OPTIONS.

**ASF**

Enable/Disable Alert Specification Format.

**Activate Remote Assistance Process**

Trigger CIRA boot.

**USB Configure**

Enable/Disable USB Configure function.

**PET Progress**

User can Enable/Disable PET Events progress to received PETevents or not.

**Intel Amt SPI Protected**

Enable/Disable Intel AMT SPI write protect.

**WatchDorg**

Enable/Disable Intel AMT SPI write protect.

**ASF**

Enable/Disable WatchDorg Timer.

**USB Configuration**

USB Configuration Parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
USB Configuration					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save ESC: Exit
USB Devices:					
1 Keyboard, 2 Hubs					
Legacy USB Support			Enabled		
USB3.0 Support			Enabled		
XHCI Hand-off			Enabled		
EHCI Hand-off			Enabled		
USB hardware delays and time-outs:					
USB transfer time-out			20 sec		
Device reset time-out			20 sec		
Device power-up delay			Auto		

**Legacy USB Support**

Enables Legacy USB support.

AUTO option disables legacy support if no USB devices are connected.

DISABLE option will keep USB devices available only for EFI applications.

**USB3.0 Support**

Enable/Disale USB3.0 (XHCI) Controller support.

**XHCI Hand-off**

This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

**EHCI Hand-off**

This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

**USB transfer time-out**

The time-out value for Control, Bulk, and Interrupt transfers.

**Device reset time-out**

USB mass storage device Start Unit command time-out.

**Device power-up delay**

Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for aHub port the delay is taken from Hub Descriptor.

**Super IO Configuration**

System Super IO Chip Parameters.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Super IO Configuration					→ ←Select Screen
Super IO Chip		Fintek F81865			↑ ↓ Select Item
-> Serial Port 0 Configuration					Enter: Select
-> Serial Port 1 Configuration					+ - Change Field
-> Serial Port 2 Configuration					F1: General Help
-> Serial Port 3 Configuration					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
Power Failure		Always off		F4: Save & Exit	
ACPI Shutdown Temperature		Disabled		ESC: Exit	

**Serial Port Configuration**

Set Parameters of Serial Ports. User can Enable/Disable the serial port and Select an optimal settings for the Super IO Device.

**Power Failure**

Options are:

Keep last state

Always on

Always off (default)

**ACPI Shutdown Temperature**

The default setting is Disabled.



**H/W Monitor**

Monitor hardware status.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
PC Health Status				→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit	
CPU		+45 C			
System Temperature		+47 C			
CPU FAN Speed		5976 RPM			
VCC3V		+3.408 V			
Vcore		+1.104 V			
+5V		+5.087 V			
+12V		+12.232 V			
+1.5V		+1.600 V			
VSB3V		+3.384 V			
VBAT		+3.296 V			
Fan1 Smart Fan Control		Disabled			

**Temperatures/Voltages**

These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

**Fan1 Smart Fan Control**

This field enables (50C/60C/70C) or disables the smart fan feature. At a certain temperature, the fan starts turning. Once the temperature drops to a certain level, it stops turning again.

**Serial Port Console Redirection**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
COM0 (Disabled)				Port is Disabled	
Console Redirection					
COM4(PCI Dev0, Func0) (Disabled)				Port is Disabled	
Console Redirection					
Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)					→ ←Select Screen
Console Redirection				Enabled	↑ ↓ Select Item
Out-of-Band Mgmt Port				COM0 (Disabled)	Enter: Select
Data Bits				8	+ - Change Field
Parity				None	F1: General Help
Stop Bits				1	F2: Previous Values
Terminal Type				VT-UTF8	F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

**Console Redirection**

Console Redirection Enable/Disable.

**Out-of-Band Mgmt Port**

Microsoft Windows Emergency Management Services (EMS) allows for remote management of a Windows Server OS through a serial port.

**Terminal Type**

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100.

**Sandybridge DTS Configuration**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Sadybridge DTS Configuration				→ ← Select Screen	
CPU DTS		Enabled		↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit	

**CPU DTS**

Disabled: ACPI thermal management uses EC reported temperature values.

Enabled: ACPI thermal management uses DTS SMM mechanism to obtain CPU temperature values.

Out of Spec: ACPI Thermal Management uses EC reported temperature values and TS SMM is used to handle Out of Spec.

**Sandybridge PPM Configuration**

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Sadybridge PPM Configuration					
EIST		Enabled			
Turbo Mode		Enabled			→ ← Select Screen
CPU C3 Report		Enabled			↑ ↓ Select Item
CPU C6 Report		Enabled			Enter: Select
CPU C7 Report		Enabled			+ - Change Field
					F1: General Help
					F2: Previous Values
					F3: Optimized Default
					F4: Save & Exit
					ESC: Exit

**EIST**

Enable/Disble Intel SpeedStep.

**Turbo Mode**

Turbo Mode.

**CPU C3 Report**

Enable/Disable CPU C3(ACPI C2) report to OS.

**CPU C6 Report**

Enable/Disable CPU C6(ACPI C3) report to OS.

**CPU C7 Report**

Enable/Disable CPU C7(ACPI C3) report to OS.

## Chipset Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
▶ System Agent (SA) Configuration ▶ PCH-IO Configuration					

## System Agent (SA) Configuration

System Agent RC Version					
Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
System Agent RC Version			1.1.0.0		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
VT-d Capability			Supported		
VT-d			Enabled		
CHAP Device (B0:D7:F0)			Disabled		
Thermal Device (B0:D4:F0)			Disabled		
Enable NB CRID			Disabled		
▶ Intel IGFX Configuration					
▶ DMI Configuration					
▶ NB PCIe Configuration					
▶ Memory Configuration					
▶ GT – Power Management Control					

### VT-d

Check to enable VT-d function on MCH.

### Enable NB CRID

Enable or disable NB CRID WorkAround.

**Intel IGFX Configuration**

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
Intel IGFX Configuration					
IGFX VBIOS Version			2102		
IGFX Frequency			650 MHz		
Primary Display			Auto		→ ← Select Screen
Internal Graphics			Auto		↑ ↓ Select Item
GTT Size			2MB		Enter: Select
Aperture Size			256MB		+ - Change Field
DVMT Pre-Allocated			64M		F1: General Help
DVMT Total Gfx Mem			256M		F2: Previous Values
Gfx Low Power Mode			Disabled		F3: Optimized Default
▶ LCD Control					F4: Save & Exit
					ESC: Exit

**Primary Display**

Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.

**Internal Graphics**

Keep IGD enabled based on the setup options.

**GTT Size**

Select the GTT Size: 1MB, 2MB.

**Aperture Size**

Select the Aperture Size: 128MB, 256MB, 512MB.

**DVMT Pre-Allocated**

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device: 0M~512M.

**DVMT Total Gfx Mem**

Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device: 128M, 256M, MAX.

**Gfx Low Power Mode**

This option is applicable for SFF only.

**LCD Control**

## Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
LCD Control					
Primary IGFX Boot Display			VBIOS Default		
Active LFP			No LVDS		
Panel Color Depth			18 Bit		→ ← Select Screen
LCD Panel Type			1024x768 LVDS		↑ ↓ Select Item
SDVO-LFP Panel Type			VBIOS Default		Enter: Select
Panel Scaling			Auto		+ - Change Field
Spread Spectrum clock Chip			Off		F1: General Help
TV1 Standard			VBIOS Default		F2: Previous Values
TV2 Standard			VBIOS Default		F3: Optimized Default
ALS Support			Enabled		F4: Save & Exit
					ESC: Exit

**Primary IGFX Boot Display**

Select the Video Device which will be activated during PoST. This has no effect if external graphics presenet.

Secondary boot display selection will appear based on your selection.

VGA modes will be supported only on primary display.

**Active LFP**

Select the Active LFP Configuration.

No LVDS: VBIOS does not enable LVDS.

Int-LVDS: VBIOS enables LVDS driver by Integrated encoder.

SDVO LVDS: VBIOS enables LVDS driver by SDVO encoder.

eDP Port-A: LFP Driven by Int-DisplayPort encoder from Port-A.

**Panel Color Depth**

Select the LFP Panel Color Depth: 18 Bit, 24 Bit.

**LCD Panel Type**

Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item: 640x480 LVDS ~ 2048x1536 LVDS.

**SDVO-LFP Panel Type**

Select SDVO panel used by Internal Graphics Device by selecting the appropriate setup item: VBIOS Default, 1024x768 ~ 1600x1200.

**Panel Scaling**

Select the LCD panel scaling option used by the Internal Graphics Device: Auto, Off, Force Scaling.

**Spread Spectrum clock Chip**

Hardware: Spread is controlled by chip;  
 Software: Spread is controlled by BIOS.

**TV1 Standard**

Select the ability to configure a TV Format.

**TV2 Standard**

Select the ability to configure a TV Minor Format.

**ALS Support**

Valid only for ACPI.

Legacy = ALS Support though the IGD INT 10 function.

ACI = ALS support through an ACPI ALS driver.

**DMI Configuration**

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
DMI Configuration					
DMI			X4 Gen2		
DMI Vc1 Control			Enabled		
DMI Vcp Control			Enabled		
DMI Vcm Control			Enabled		
DMI Link ASPM Control			L0sL1		
DMI Extended Synch Control			Disabled		
DMI Gen 2			Enabled		
			→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit		

**NB PCIe Configuration**

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
NB PCIe Configuration					
PEG0			Not Present		
PEG0 – Gen X			Auto		
PEG0			Not Present		
PEG1 – Gen X			Auto		
PEG0			Not Present		
PEG2 – Gen X			Auto		
PEG0			Not Present		
PEG3 – Gen X			Auto		
Always Enable PEG			Disabled		
			→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit		

## Memory Configuration

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Memory Information					
Memory RC Version			1.1.0.0		
Memory Frequency			1333 Mhz		
Total Memory			4096 MB (DDR3)		
DIMM#0			4096 MB (DDR3)		
DIMM#1			Not Present		
DIMM#2			Not Present		
DIMM#3			Not Present		
CAS Latency (tCL)			9		
Minimum delay time					
CAS to RAS (tRCDmin)			9		
Row Precharge (tRPmin)			9		
Active to Precharge (tRASmin)			24		
DIMM profile			Default DIMM profile		
Memory Frequency			Auto		
Max TOLUD			Dynamic		
Nmode Support			Auto		
Memory Scrambler			Disabled		
RMT Crosser Support			Disabled		
MRC Fast Boot			Disabled		
DIMM Exit Mode			Auto		
				→ ←Select Screen	
				↑ ↓ Select Item	
				Enter: Select	
				+- Change Field	
				F1: General Help	
				F2: Previous Values	
				F3: Optimized Default	
				F4: Save & Exit	
				ESC: Exit	

## GT – Power Mangement Control

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
GT – Power Management Control			GT2 (0x116)		→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
GT Info					
RC6 (Render Standby)					
GT OverClocking Support		Enabled			
		Disabled			



## PCI-IO Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit	
Intel PCH RC Version			1.1.0.0	<div>→ ← Select Screen</div> <div>↑ ↓ Select Item</div> <div>Enter: Select</div> <div>+ - Change Field</div> <div>F1: General Help</div> <div>F2: Previous Values</div> <div>F3: Optimized Default</div> <div>F4: Save &amp; Exit</div> <div>ESC: Exit</div>		
PCH LAN Controller			Enabled			
Wake on Lan Enabled			Disabled			
Azalia			Auto			
Azalia Docking Support Enable			Disabled			
Azalia PME Enable			Disabled			
Azalia Internal HDMI Codec			Enabled			
Display logic			Enabled			
CLKRUN# logic			Enabled			
Enable SB CRID			Disabled			
High Precision Event Timer Configuration			Enabled			
High Precision Timer						
SLP_S4 Assertion Width			4-5 Seconds			
Set NAND Management Override			Enabled			
► USB Configuration						
► PCI Express Configuration						

### Azalia

Control Detectin of the Azalia device.

Disabled = Azalia will be unconditionally disabled.

Enabled = Azalia will be unconditionally enabled. Auto = Azalia will be enabled if present, disabled otherwise.

### Set NAND Management Override

Option to Override NAND Management to allow driver or 3<sup>rd</sup> parties software to configure the NAND module after POST.

## USB Configuration

Aptio Setup Utility

Main	Advanced	Chipset	Boot	Security	Save & Exit
EHCI1			Enabled		
EHCI2			Enabled		
USB Ports Per-Port Disable Control			Disabled		

### EHCI1

Control the USB EHCI (USB2.0) functions.

One EHCI controller must always be enabled.

## PCI Express Configuration

Aptio Setup Utility			
Main	Advanced	Chipset	Boot      Security      Save & Exit
PCI Express Clock Gating		Enabled	→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit
DMI Link ASPM Control		L0sL1	
DMI Link Extended Synch Control		Disabled	
Subtractive Decode		Disabled	
▶ PCI Express Root Port1			
▶ PCI Express Root Port2			
▶ PCI Express Root Port3			
▶ PCI Express Root Port4			
▶ PCI Express Root Port5			
PCI Port 6 is assigned to LAN			
▶ PCI Express Root Port7			
▶ PCI Express Root Port8			
Low MMIO Align		64M	
Initiate Graphic Adapter		PEG/IGD	
Graphics Turbo IMON Current		31	
VT-d		Disabled	
PCI Express Port		Auto	
IGD Memory		32M	
PAVP Mode		Disabled	
PEG Force Gen1		Disabled	

**DMI Clink ASPM Control**

The control of Active State Power Management on both NB side and SB side of the DMI Link.

**DMI Link Extended Synch Control**

The control of Extended Synch on SB side of the DMI Link.

## Boot Settings

This section allows you to configure the boot settings according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Boot Configuration			1		
Setup Prompt Timeout			On		
Bootup NumLock State			Disabled		
Quite Boot			07.63		
CM16 Module Version			Upon Request		
GateA20			Force BIOS		
Option ROM Messages			Disabled		
Interrupt 19 Capture					
Boot Option Priorities					

### Seutp Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

### GateA20 Active

UPON REQUEST – GA20 can be disabled using BIOS services.

ALWAYS – do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.

### Option ROM Messages

Set display mode for Option ROM. Options are Force BIOS and Keep Current.

### Interrupt 19 Canture

Enable: Allows Option ROMs to trap Int 19.

### Boot Option Priorities

Sets the system boot order.

## Security Settings

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Password Description					
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.				→ ← Select Screen	
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights				↑ ↓ Select Item	
Administrator Password				Enter: Select	
User Password				+- Change Field	
Set User Password				F1: General Help	
Set Master Password				F2: Previous Values	
				F3: Optimized Default	
				F4: Save & Exit	
				ESC: Exit	

### Administrator Password

Set Setup Administrator Password.

### User Password

Set User Password.

## Save & Exit Settings

Aptio Setup Utility					
Main	Advanced	Chipset	Boot	Security	Save & Exit
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset  Save Options Save Changes Discard Changes  Restore Defaults Save as User Defaults Restore User Defaults  Boot Override  Launch EFI Shell from filesystem device					→ ← Select Screen ↑ ↓ Select Item Enter: Select +- Change Field F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit

### Save Changes and Exit

Exit system setup after saving the changes.

### Discard Changes and Exit

Exit system setup without saving any changes.

### Save Changes and Reset

Reset the system after saving the changes.

### Discard Changes and Reset

Reset system setup without saving any changes.

### Save Changes

Save Changes done so far to any of the setup options.

### Discard Changes

Discard Changes done so far to any of the setup options.

### Restore Defaults

Restore/Load Defaults values for all the setup options.

**Save as User Defaults**

Save the changes done so far as User Defaults.

**Restore User Defaults**

Restore the User Defaults to all the setup options.

**Boot Override**

Pressing ENTER causes the system to enter the OS.

**Launch EFI Shell from filesystem device**

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

---

## Drivers Installation

This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

Intel Chipset Software Installation Utility .....	52
VGA Drivers Installation .....	53
Realtek HD Audio Driver Installation .....	54
LAN Drivers Installation .....	55
Intel® Management Engine Interface .....	57
ASMedia USB 3.0 Drivers .....	59

### **IMPORTANT NOTE:**

After installing your Windows operating system, you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

## Intel Chipset Software Installation Utility

---

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation.

1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.



2. Click **Intel(R) Chipset Software Installation Utility**.



3. When the Welcome screen to the Intel® Chipset Device Software appears, click **Next** to continue.

4. Click **Yes** to accept the software license agreement and proceed with the installation process.

5. On the Readme File Information screen, click **Next** to continue the installation.

6. The Setup process is now complete. Click **Finish** to restart the computer and for changes to take effect.



## VGA Drivers Installation

**NOTE:** Before installing the *Intel(R) QM67 Chipset Family Graphics Driver*, the Microsoft .NET Framework 3.5 SPI should be first installed.

To install the VGA drivers, follow the steps below.

1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.

2. Click **Intel(R) QM67 Chipset Family Graphics Driver**.



3. When the Welcome screen appears, click **Next** to continue.



4. Click **Yes** to agree with the license agreement and continue the installation.

5. On the Readme File Information screen, click **Next** to continue the installation of the Intel® Graphics Media Accelerator Driver.

6. On Setup Progress screen, click **Next** to continue.

7. Setup complete. Click **Finish** to restart the computer and for changes to take effect.

---

## Realtek HD Audio Driver Installation

---

Follow the steps below to install the Realtek HD Audio Drivers.

1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.

2. Click **Realtek High Definition Audio Driver**.



3. On the Welcome to the InstallShield Wizard screen, click **Yes** to proceed with and complete the installation process.



## LAN Drivers Installation

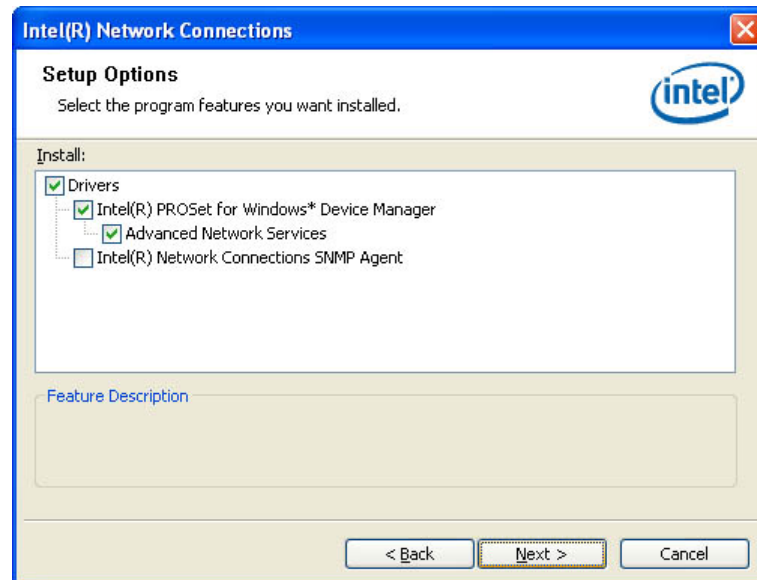
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.

2. Click **Intel(R) PRO LAN Network Driver**.

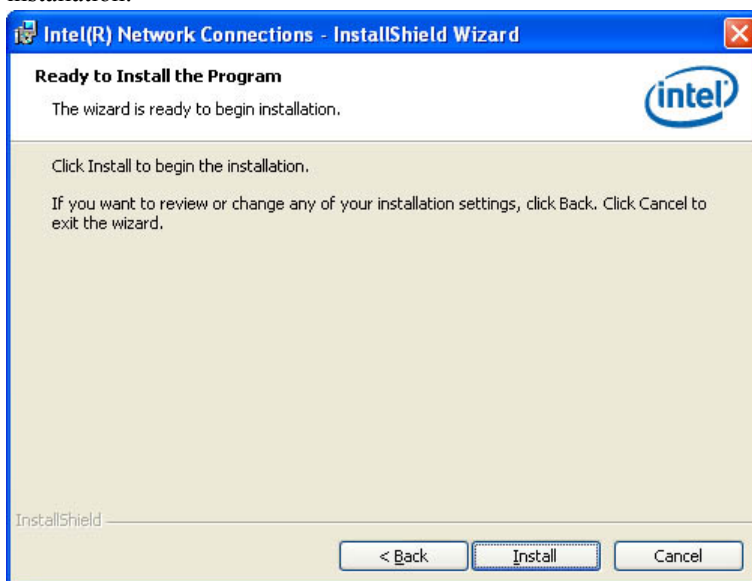


3. When the Welcome screen appears, click **Next**. On the next screen, click **Yes** to agree with the license agreement.

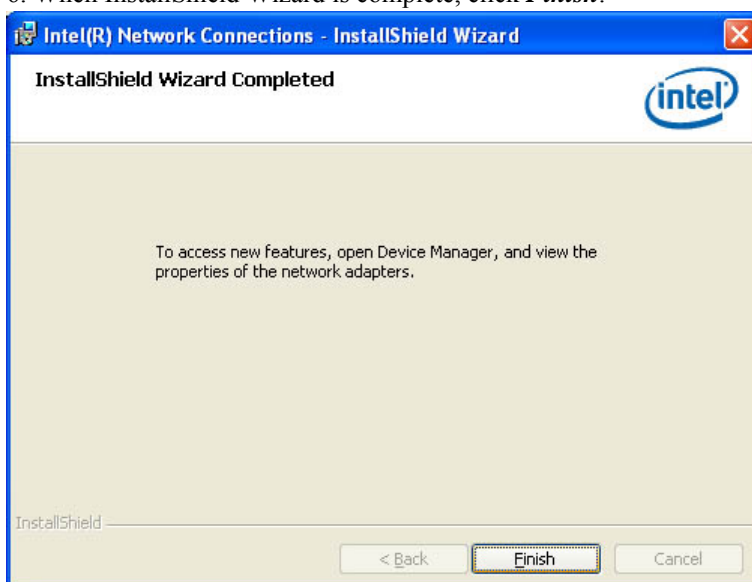
4. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.



5. The wizard is ready to begin installation. Click **Install** to begin the installation.



6. When InstallShield Wizard is complete, click **Finish**.



## Intel® Management Engine Interface

**REMARKS:** The Intel iAMT 7.0 Drivers can be installed on MI956AF, not MI956F.



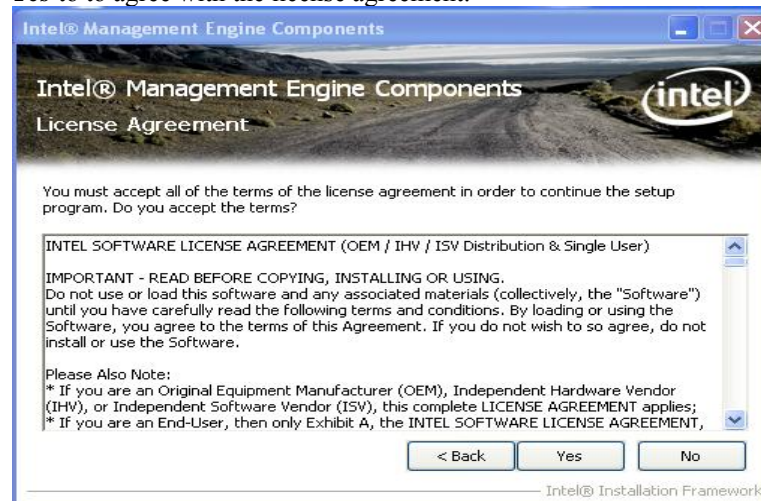
The following application requires Microsoft .NET Framework 3.5 or later: Intel® Management Engine Components. Please install the latest version of Microsoft .NET Framework from Microsoft Download Center to run this application correctly.

Follow the steps below to install the Intel Management Engine.

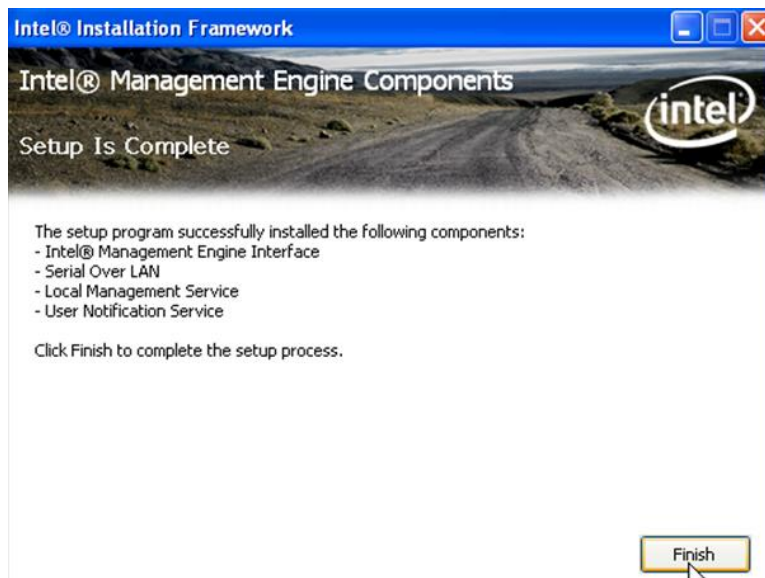
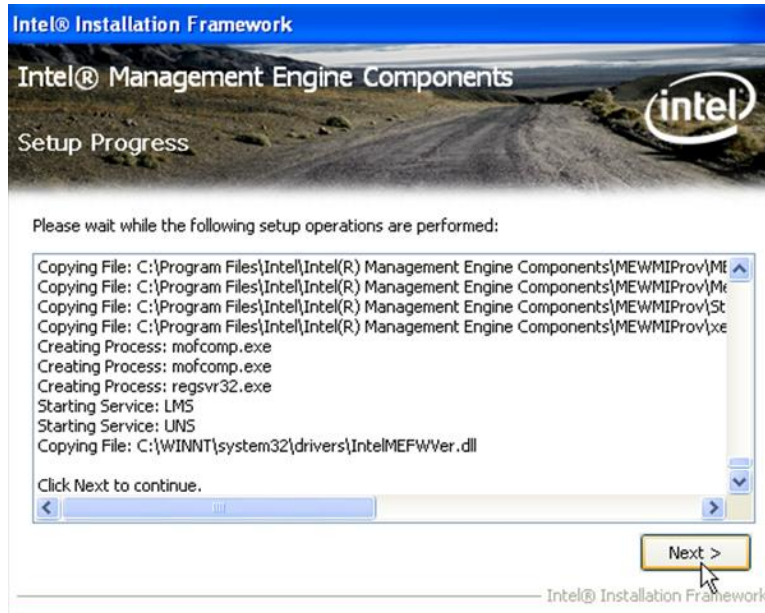
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) AMT 7.0 Drivers**.



2. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click **Next**. On the next screen, click **Yes** to agree with the license agreement.



2. When the Setup Progress screen appears, click **Next**. Then, click **Finish** when the setup progress has been successfully installed.





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## ASMedia USB 3.0 Drivers

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1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) QM67/Q67 Chipset Drivers**.

2. Click **Intel(R) PRO LAN Network Driver**.



2. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click **Next**.



3. When InstallShield Wizard is complete, click **Finish**.



## Appendix

### A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
278h - 27Fh	Parallel Port #2(LPT2)
2E8h - 2EFh	Serial Port #4(COM4)
2F8h - 2FFh	Serial Port #2(COM2)
2B0h - 2DFh	Graphics adapter Controller
360h - 36Fh	Network Ports
3B0h - 3BFh	Monochrome & Printer adapter
3C0h - 3CFh	EGA adapter
3D0h - 3DFh	CGA adapter
3E8h - 3EFh	Serial Port #3(COM3)
3F8h - 3FFh	Serial Port #1(COM1)



## B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Reserved
IRQ7	Reserved
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Serial Port #3
IRQ11	Serial Port #4
IRQ12	PS/2 Mouse
IRQ13	80287
IRQ14	Primary IDE
IRQ15	Secondary IDE

## C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

```
//-----  
//  
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY  
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE  
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR  
// PURPOSE.  
//  
//-----  
#include <dos.h>  
#include <conio.h>  
#include <stdio.h>  
#include <stdlib.h>  
#include "F81865.H"  
//-----  
int main (int argc, char *argv[])  
{  
    void EnableWDT(int);  
    void DisableWDT(void);  
    //-----  
    int main (int argc, char *argv[])  
    {  
        unsigned char bBuf;  
        unsigned char bTime;  
        char **endptr;  
  
        char SIO;  
  
        printf("Fintek 81865 watch dog program\n");  
  
        SIO = Init_F81865();  
        if (SIO == 0)  
        {  
            printf("Can not detect Fintek 81865, program abort.\n");  
            return(1);  
        }  
        if (argc != 2)  
        {  
            printf("Parameter incorrect!!\n");  
            return (1);  
        }  
  
        bTime = strtol (argv[1], endptr, 10);  
        printf("System will reset after %d seconds\n", bTime);  
  
        if (bTime)  
        {  
            EnableWDT(bTime);  
        }  
        else  
        {  
            DisableWDT();  
        }  
  
        return 0;  
    }  
}
```

---

```

//-----
void EnableWDT(int interval)
{
    unsigned char bBuf;

    bBuf = Get_F81865_Reg(0x2B);
    bBuf &= (~0x20);
    Set_F81865_Reg(0x2B, bBuf);           //Enable           WDTO

    Set_F81865_LD(0x07);                  //switch           to logic device 7
    Set_F81865_Reg(0x30, 0x01);           //enable           timer

    bBuf = Get_F81865_Reg(0xF5);
    bBuf &= (~0x0F);
    bBuf |= 0x52;
    Set_F81865_Reg(0xF5, bBuf);           //count           mode is second

    Set_F81865_Reg(0xF6, interval);       //set             timer

    bBuf = Get_F81865_Reg(0xFA);
    bBuf |= 0x01;
    Set_F81865_Reg(0xFA, bBuf);           //enable           WDTO output

    bBuf = Get_F81865_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81865_Reg(0xF5, bBuf);           //start           counting
}
//-----
void DisableWDT(void)
{
    unsigned char bBuf;

    Set_F81865_LD(0x07);                  //switch           to logic device 7

    bBuf = Get_F81865_Reg(0xFA);
    bBuf &= (~0x01);
    Set_F81865_Reg(0xFA, bBuf);           //disable           WDTO output

    bBuf = Get_F81865_Reg(0xF5);
    bBuf &= (~0x20);
    bBuf |= 0x40;
    Set_F81865_Reg(0xF5, bBuf);           //disable           WDT
}
//-----

```

```

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81865.H"
#include <dos.h>
//-----
unsigned int F81865_BASE;
void Unlock_F81865 (void);
void Lock_F81865 (void);
//-----
unsigned int Init_F81865(void)
{
    unsigned int result;
    unsigned char ucDid;

    F81865_BASE = 0x4E;
    result = F81865_BASE;

    ucDid = Get_F81865_Reg(0x20);
    if (ucDid == 0x07) //F                                intek 81865
    {
        goto Init_Finish;
    }

    F81865_BASE = 0x2E;
    result = F81865_BASE;

    ucDid = Get_F81865_Reg(0x20);
    if (ucDid == 0x07) //F                                intek 81865
    {
        goto Init_Finish;
    }

    F81865_BASE = 0x00;
    result = F81865_BASE;

Init_Finish:
    return (result);
}
//-----
void Unlock_F81865 (void)
{
    outportb(F81865_INDEX_PORT, F81865_UNLOCK);
    outportb(F81865_INDEX_PORT, F81865_UNLOCK);
}
//-----
void Lock_F81865 (void)
{
    outportb(F81865_INDEX_PORT, F81865_LOCK);
}
//-----
void Set_F81865_LD( unsigned char LD)
{
    Unlock_F81865();
    outportb(F81865_INDEX_PORT, F81865_REG_LD);
    outportb(F81865_DATA_PORT, LD);
    Lock_F81865();
}
//-----
void Set_F81865_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_F81865();
    outportb(F81865_INDEX_PORT, REG);
    outportb(F81865_DATA_PORT, DATA);
    Lock_F81865();
}
//-----
unsigned char Get_F81865_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_F81865();

```

```

        outportb(F81865_INDEX_PORT, REG);
        Result = inportb(F81865_DATA_PORT);
        Lock_F81865();
        return Result;
    }
    //-----

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#ifndef F81865_H
#define F81865_H 1
//-----
#define F81865_INDEX_PORT (F81865_BASE)
#define F81865_DATA_PORT (F81865_BASE+1)
//-----
#define F81865_REG_LD 0x 07
//-----
#define F81865_UNLOCK 0x 87
#define F81865_LOCK 0x AA
//-----
unsigned int Init_F81865(void);
void Set_F81865_LD(unsigned char);
void Set_F81865_Reg(unsigned char, unsigned char);
unsigned char Get_F81865_Reg(unsigned char);
//-----
#endif // F81865_H

```